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ABSTRACT

This study explored the relationships among communication technologies, communication apprehension, writing apprehension, and computer anxiety. Participants were 130 students from a variety of undergraduate oral communication classes in a large midwestern university who completed a modified form, 10 items, of McCroskey's Personal Report of Communication Apprehension (PRCA). Results indicate that significant relationships exist between computer anxiety and computer/word processing, between computer anxiety and computer electronic discussion group, between computer anxiety and online computer service, and between computer anxiety and CD-ROM, as well as other types of technology. Other results reveal that students are least experienced with programming computers, computerized electronic discussion group, computer conferencing and Integrated Service Digital Network (ISDA). Significant differences occurred between gender groups on cellular phone scores, writing stories/poetry scores, computerized electronic discussion group scores, satellite TV scores, electronic videogames scores, and computer/video conferencing scores, as well as communication apprehension scores, writing apprehension scores, and computer anxiety scores. (Contains 6 tables of data and 16 references.) (Author/NKA)

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An Investigation of the Relationships among Technology Experiences, Communication Apprehension, Writing Apprehension and Computer Anxiety

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"An Investigation of the Relationships among Technology Experiences, Communication Apprehension, Writing Apprehension and Computer Anxiety"

Abstract

This study explored the relationships among communication technologies, communication apprehension, writing apprehension, and computer anxiety. The results indicate that significant relationships exist between computer anxiety, and computer/wordprocessing, between computer anxiety, and computer electronic discussion group, between computer anxiety and online computer service, between computer anxiety and CD-RAM, as well as other types of technology. Other results reveal that students are least experienced with programming computers, computerized electronic discussion group, computer conferencing and Integrated Service Digital Network (ISDA). Significant differences occurred between gender groups on cellular phone scores, writing stories/poetry scores, computerized electronic discussion group scores, satellite TV scores, electronic videogames scores, and computer/video conferencing scores, as well as communication apprehension scores, writing apprehension scores, and computer anxiety scores. The specifics of these results and other significant differences are reported and discussed in this paper.

Over the past quarter century new technologies continue to be developed. School systems continue to develop distance education courses, electronic classroom discussions and various worldwide web applications. Recent research by Craig (1994) concluded that computer-related anxiety and stress can affect millions of workers everyday. In addition, research indicates that communication apprehension, the anxiety related to communication, affects from 5 to 30 percent of the population. Approximately 30 years ago the Speech Communication Association Ad Hoc Committee on Evaluation recommended that an instrument be developed to measure speech communication apprehension at various levels. Shortly after this McCroskey (1970) developed the Personal Report of Communication Apprehension (PRCA).

In 1975 Daly and Miller developed the Writing Apprehension Test (WAT) which is "a situation and subject-specific individual differences concerned with people's general tendencies to approach or avoid writing." Research suggests that 20 percent of the adult population suffer from writing apprehension. In addition , Craig (1994) concluded that 55 percent of Americans suffer from some degree of technophobia which refers to such conditions as computer anxiety, computer aversion, communicator apprehension and computer stress (see Balance & Rogers, 1991; Yeaman, 1992; Dobos, 1995; Scott & Rockwell, 1997). These labels emphasize a concern or fear associated with technology, usually the computer.

This study uses the Scott and Rockwell article (1997) as a model to examine the relationships among communication apprehension, writing apprehension, computer anxiety, and various technologies.

Communication Apprehension

McCroskey's self-report instrument, Personal Report of Communication Apprehension (PRCA) , focuses on fear of social disapproval in public speaking

and in dyadic and group communication situations. The instrument deals with the encoding process of the speaker. The public speaking items were developed by Gilkenson's PRCS . The items that focus on dyadic and group communication were developed by McCroskey and graduate students. Factor analysis with varimax rotation reveal that 20 of the 76 items were unidimensional. In addition, McCroskey (1984) noted that communication apprehension is an individual trait and is closely related to shyness and reticence. Typically, high apprehensives are more likely to withdraw from communication situations

Limited research has been completed to explore the relationship between technologies and oral communication apprehension. Reinsch (1985) predicted that high apprehensives should experience more anxiety when participating in phone conferences, video conferences, and videotaping. In another study Scott (1994) suggested that communication apprehension and satisfaction with the technology were correlated.

Writing Apprehension

Daly and Miller (1975) developed the Writing Apprehension Test (WAT). They reworded items from the PRCA. Dobos (1995) reported a reliability coefficient of .95. Twenty items were unidimensional. The items focused on anxiety associated with writing situations, a tendency to avoid such situations, frustration, and low productivity while writing. Research by Daly (1977) and Daly and Miller (1979) concluded that writing apprehension affects school major, career choice, enrollment in various writing classes, as well as message quality, message length, and other communication outcomes. Mabrito (1991) concluded that subjects with writing apprehension become frustrated and have low productivity while writing.

Over the past 10 years there has been a rapid increase in text-based interactions with many new technologies. The impact of writing apprehension in terms of these new technologies (e.g. email) should be explored. For example, Hartman et al. (1991) found that writing apprehension was negatively related to teacher-student interaction using electronic communication. Other research by Harris and Grandgenett (1992) discovered that high levels of writing apprehension were associated with less frequent log-onto an electronic communication system. These results support earlier research (Reinsch, 1985). Scott and Rockwell (1997) indicated that there is no significant relationship between writing apprehension and computer anxiety and there is no significant relationships between word-processing and writing apprehension, between email and writing apprehension, but a significant negative relationship exists ($p < .001$) between writing a paper and writing apprehension.

Research Questions

Based on the review of literature, especially the Scott and Rockwell study (1997), this study replicates in part and extends their study. Specifically, the study is designed to determine students' experiences with technology, relationships between each technology experience and computer anxiety, communication apprehension, and writing apprehension, relationships between computer anxiety and communication apprehension, between computer anxiety and writing apprehension, and between communication apprehension and writing apprehension. A factor analysis was completed on technology experience scores to determine if there are factors that emerge. Research also determined if there are differences between gender groups. Specific research

questions are stated below:

1. What are the means for the technology variables?

2. Are there significant differences between gender groups on technology variable scores ($p < .05$)?

3. Are there significant differences between gender groups on technology factor scores ($p < .05$)?

4. Are there significant differences between gender groups on apprehension variables ($p < .05$)?

5. Are there significant correlations between technology variable scores and apprehension variable scores ($p < .05$)?

6. Are there significant differences between technology factor scores and apprehension variable scores ($p < .05$)?

Statistical Analysis

Chi square analyses was completed to determine differences between gender groups on each technology variable. Oblique factor analysis with varimax rotation was completed to determine if different factors emerge. If factors emerge, analysis of variance was completed to determine if significant differences exist between gender groups on these factors, as well as differences between groups on computer anxiety, communication apprehension, and writing apprehension. Next stepwise discriminant function analyses was completed to determine the ordering of discriminating variables. Correlational analyses was completed to determine relationships among variables and factors.

Procedure

One hundred thirty students (male = 61; female = 69) from a variety of undergraduate oral communication classes from a large midwestern university participated in this study. Students were instructed to complete the instruments as part of an information gathering task on the first day of the quarter. A cover letter on the instrument, as well as oral instructions developed by the researchers were read to participating students.

Variables

The authors obtained a copy of the instruments from Scott and Rockwell. They used a modified form, 10-items, of McCroskey's Personal Report of Communication Apprehension (PRCA). Dobos (1995) reported a reliability coefficient of .95. Daly and Miller's (1975) 20-item measure was used to determine writing apprehension. Raub's (1981) 10-item computer anxiety measure was used. Previous research by Ray and Minch (1990) produced alpha range from .81 to .86. All three instruments used a 5-point Likert-type scale anchored by strongly agree to strong disagree. Likewise, all three instruments used several items that are reverse coded to avoid response bias. Composite scores were used for each type of apprehension/anxiety.

Results

The results, based on the means, indicate that students are experienced with the following types of technology: writing letters, basic phone, word-processing, e-mailing people on the computer, and viewing the VCR, and are least experienced with programming computers, computerized electronic

discussion group, computer video conferencing and Integrated Service Digital Network (ISDA).

The results, reported in Table 1, indicate that significant differences ($p < .05$) occurred between gender groups on cellular phone, writing stories/poetry, computerized electronic discussion group, satellite TV, and electronic videogames, and computer conference/video conferencing. Significant differences ($p < .05$) also occurred between gender groups on computer talk factor scores, phone services factor scores, computer anxiety scores, writing apprehension scores, and communication apprehension scores (see Tables 3 and Table 4). The discriminant function analysis indicates that the Computer Talk Factor and Computer Anxiety variable are the best discriminating variables ($p < .05$).

The correational analyses, reported in Table 5, reveal that significant relationships ($p < .05$) exist between computer anxiety and computer/wordprocessing, between computer anxiety and computer electronic discussion group, between computer anxiety and online computer service, between computer anxiety and CD-ROM, between computer anxiety and FAX machine, between computer anxiety and pager or beeper, between computer anxiety and viewing the VCR, between computer anxiety and computer/ video conferencing, and between computer anxiety and ISDA. Other results reveal that there is a significant relationship between writing stories and writing apprehension, and between public presentation and communication apprehension.

In Table 6 significant differences occurred between Computer Talk factor and Phone Service Factor, between Computer Talk factor and Daily Technology factort, and between Computer Talk factor and Communication Apprehension

variable. between Daily Technology factor and Writing Apprehension variable, between Daily Technology factor and Communication Apprehension variable, and between Writing Apprehension variable and Communication apprehension variable.

Discussion

An interpretation of the results of technology experiences with groups indicates that females have significantly more experience in making public presentations, writing stories/poetry, using the cellular phone, whereas males have significantly more experience in computerized electronic discussion group, CD-RAM, electronic videogames, and computer /video conferencing. These results seem to indicate that females have more experiences in common technology activities and males have more experiences in advanced or more recently developed technologies. Scott and Rockwell (1997) do not report differences between gender groups on each technology experience. Comparisons, however, can be made between the two studies on mean experiences. These results indicate wide differences exist between groups on computer/wordprocessing, e-mailing people on the computer, online computer service, and the use of FAX machine. In all cases subjects in this study have had more experiences in each of the areas. In both studies students have had the least experience in ISDN experience, computer/video conferencing and programming computers.

The differences between sample groups in technology experiences can be explained in different way. The demographic of the two samples might be different. In the Scott and Rockwell (1997) study the sample was selected from

public speaking classes. It might be that a high percentage of the students were freshmen or sophomores and between the ages of 18 and 20. In contrast, in this study students were selected from a variety of oral communication classes and the educational level ranged from sophomore through senior year. Thus, students in this study might have had more educational technology experiences and more professional experiences in using the various types of technology.

Unlike Scott and Rockwell, the researchers in this study completed a factor analysis and added the scores that loaded on each of the factors. The results reveal that males scored significantly higher on the Computer Talk factor, while females scored significantly higher on the Phone Service factor. These results reinforce the item by item results in that females have significantly more experiences in oral communication activities and fewer experiences in advanced technology. In addition the results are reinforced as females have significantly lower communication apprehension scores than males and significantly higher computer anxiety scores than males.

The correlational analyses revealed the following:

1. Students who have more public presentation experiences report that they have lower oral communication apprehension than students with fewer oral presentation experiences.
2. Student who have more writing experiences have lower report lower writing apprehension scores than those with fewer writing experiences.
3. Students who experience more computer anxiety have had few technology experiences `in the following areas:
    a. computer/wordprocessing
    b. computer electronic discussion group
    c. online computer service

d. pager or beeper

e. viewing the VCR

f. computer/video conferencing

g. ISDA

The relationships between computer anxiety and these technologies range from .05 to .001. For the most part the relationships account for a marginal percentage of the variances. Thus, the practical significance of the findings is very limited.

The correlations among technology factors, among technology factors and apprehension factors and among apprehension factors reveal that there are significant relationships among Computer Talk scores and Phone Service scores and Daily Technology scores, but not Entertainment scores. These relationships create a picture that subjects who are experienced in one type of technology are experienced in other types of technology. The results also indicate that subjects who score high on the Daily Technology factor have low writing apprehension scores and low oral communication apprehension scores and that there appears to be no relationship between Daily Technology and computer anxiety.

The results of the study confirm that students have had a variety of technology experiences. When considering only computer experiences, students are very experienced in word/processing, online computer services, e-mailing people on the computer, but have had limited experience participating in computerized electronic discussion group, computer / video conferencing and programming computers. The correlation results reveal that the more experiences the less computer anxiety. Several types of survey studies might be completed to track the changes as students learn the new technology. For example, if a panel study were done with freshmen students 1997, 1999 and 2001

using the technology instrument, researchers would be able to determine if computer anxiety goes down during the student college years. This study could focus just on computers or all the technologies in the technology instrument. This would test the popular assumption from a technology standpoint that when exposed to technology the anxiety will be lower or eliminated. This same type of study might be done at the elementary, junior high, and senior high levels.

Other research might be done to identify the high computer anxiety students and use a variety of techniques to lower that anxiety. For example. Reinch (1985) recommends classroom instruction, systematic desensitization and counseling.

Computer technology, as well as other technologies, will continue to be developed as the world moves into the 21st century and people from various parts of the world need to develop proficiency in using computers. Research needs to be completed with all age groups. The adult population needs to learn the same technologies that students learn at the elementary level, junior high level, senior high level and college level. The technology instrument, or instruments on specific types of technology need to be developed to identify the perceived expertise of various populations, the perceived level of computer anxiety and programs need to be targeted to help individuals overcome these anxieties.

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Table 1

Experience with Technology Between Gender Groups

Technology	Mean Experience	X	P
Public Presentation	3.66	6.89	.10
Writing letters	4.27	.063	-
Computer/Wordprocessing	4.88	.021	-
Basis Phone	4.91	.604	-
Cellular phone	2.81	8.366	.05
Writing Stories/Poetry	2.69	7.039	.05
Computerized Electronic Discussion Groups	2.77	9.756	.05
Programming Computers	2.19	4.012	-
Online computer services	4.06	2.69	-
CD-ROM	3.37	6.61	.10
Cable Television	3.94	11.96	-
Satellite TV	2.49	6.49	.10
Electronic Videogames	3.25	2.57	.001
E-mailing people on computer	4.63	1.66	-
FAX machine	4.27	2.16	-
Pager or Beeper	3.69	3.42	-
Viewing VCR	4.54	2.67	-
Advanced Phone Capabilities	4.05	3.259	-
Computer Conference/ Video conference	2.59	8.787	.05
Integrated Services Digital Network (ISDA)	2.43	3.17	-

Table 2
Factor Analysis Experience with Technology

Factors	Loadings
COMPUTER TALK	
Election Discussion	.78
Computer/Video Conferencing	.82
CD-ROM Device	.83
Online Service	.49
ISDN	.73
PHONE SERVICES	
Advanced Phone Capabilities	.77
Cellular Phone	.53
ENTERTAINMENT	
Cable Television	.71
Satellite Television	.85
Electronic Videogames	.50
DAILY TECHNOLOGY	
Wordprocessing	.76
Fax Machines	.65
E-mail	.83

Computer Talk accounts for 3 percent of the variance
Phone Services account for 16 percent of the variance
Entertainment accounts for 11 percent of the variance
Daily Technology account for 8 percent of the variance

Table 3
Significant Differences between Gender Groups on Technology Factors

FACTORS	Gender	Mean	F	P
Computer Talk	Male	14.88	6.972	.01
	Female	11.72		
Phone Services	Male	6.72	3.935	.05
	Female	7.84		

Table 4
Gender Differences on Apprehension Variables

DV	IV	Means	F	P
Computer Anxiety	Male	18.28	4.511	.05
	Female	22.44		
Writing Apprehension	Male	40.6	.863	-
	Female	42.97		
Communication Apprehension	Male	27.2	4.654	.03
	Female	23.28		

Table 5
Correlations of Apprehension/Anxiety Measures with Likelihood to Use Each Technology

Technology	Communication App.	Computer Anxiety	Writing App.
Public Presentation	-.37***	.03	-.06
Writing letters	-.05	-.08	-.01
Computer/Wordprocessing	.03	-.40***	-.07
Basic Phone	-.01	.13	.14
Cellular Phone	-.18	.04	.17
Writing Stories/Poetry	-.14	-.14	-.44***
Computerized Electronic Discussion Group	-.14	-.45***	-.15
Programming Computers	-.05	-.43***	-.08
Online Computer Services	.11	-.63***	-.19
CD-ROM	-.005	-.21**	-.07
Cable Television	-.18	-.05	-.13
Satellite TV	-.06	-.1	-.02
Electronic Videogames	-.18	-.05	-.07
E-mailing People on Computers	-.04	-.56***	-.17
FAX machine	-.07	-.30**	. 08
Pager or Beeper	-.18	.21*	.17
Viewing VCR	-.24**	-.42***	-.13
Advanced Phone Capabilities	-.13	-.09	..14
Computer Conference/ Videoconference	.01	-.27**	-.14
Integrated Service Digital Network (ISDA)	-.11	.50***	-.11

Note: *p < .05; **p < .01; ***p < .001.

Table 6
Correlations among Technology Experiemce Factors and Apprehension variables

Variables	CT	PS	ET	DT	CA	WA	Com A
CT		.26*	.08	.34**	. 03	-.17	-.47**
PS			.15	.11	-.12	-.11	-.06
ET				-.04	.-13	-.17	-..03
DT					.11	-.32**	-.53**
CA						-.005	-.16
WA							.23*
Com. A							

$p < .02$: $p < .001$

CT=Computer Talk
PS=Public Services
ET= Entertainment
DT=Daily Technology
CA=Comunication Apprehension
WA= Wtriting Apprehension
Com A=Computer Anxiety